

CLASS 173, TOOL DRIVING OR IMPACTING**SECTION I - CLASS DEFINITION****SUBJECT MATTER OF THE CLASS**

(A) The purpose of this class is to provide a search for subject matter directed to means for driving a tool and also reciting some feature relating to the tool, or reciting a combination of features peculiar to driving a tool which cause separate classification in the specific motor classes, and in the specific machine element and mechanism classes to be impractical, but which subject matter is of such general application in the tool arts that separate classification in each specific tool class is also impractical.

(B) The term, tool, as used in this class means primarily a work contacting element which functions to effect some physical alteration in the work, such as chipping or boring, but is also used to include other elements which are driven in the same manner as such a tool (e.g., a nail or post). It must be noted, however, as explained in the next paragraph, that a means which impacts a tool is not in itself, regarded as a tool.

(C) The term, impacting device, as used in this class defines a means including a mass of material (i.e., hammer head) which is specifically intended to deliver an impact or blow to a tool as defined in paragraph B and is not itself a tool but is defined as a species of means for driving a tool.

(D) This class, in accordance with the purpose of paragraph A, provides for an impacting device, as defined in paragraph C, or a means to actuate the hammer head of an impacting device, said impacting device or means to actuate said hammer head being claimed in combination with at least one of the following features relating to a tool as defined in paragraph B: (1) a nominally recited tool, (2) a means to retain or hold a tool to receive a blow, (3) a means to align a tool with respect to the hammer head to receive a blow, or (4) a means (anvil) situated between the hammer head and a tool and which is intended to transmit a blow from the hammer head to the tool.

(E.) This class also provides for a motor and/or a machine element or mechanism for driving a tool claimed in combination with one or more of the following: (1) a means for causing, controlling, or selectively preventing the advancing movement of a driven tool, (2) a cleansing means, i.e., a means for cleaning the area of tool operation or (3) a manipulating handle. In the

absence of a separate drive means, a means to cause, control or selectively prevent advance claimed in combination with a cleansing means will be classified in this class.

(F) This class also provides for processes of operating apparatus included under the class definition and not claiming any additional feature limiting the process to a particular art.

(G) This class also is intended to provide for subject matter in accordance with the purpose of paragraph A not specifically provided for in paragraphs D, E and F or excluded by paragraphs H and J. Examples of such subject matter are means for driving a tool combined with (1) a vehicle support for the drive, (2) work engaging means supporting the drive or (3) means to adjust the position of the axis of tool advance. This class also includes subcombinations of impacting device structure which are not elsewhere classifiable such as a specific means to transmit an impact from a hammer head to a tool.

(H) This class is not intended to provide original classification for a claim having any specific recitation of (1) the work contacting portion of the tool, (2) plural, cooperating tools (e.g., angularly related tools), (3) and underlying work support opposed to the tool, or (4) any other specifically recited feature pointing to classification in a particular tool art and not provided for in this definition. An exception to (1) is that the recitation of the work contacting portion of the tool as being broadly provided with a cleansing fluid passage or port is not considered to define the work contacting portion of the tool with sufficient specificity to preclude classification from Class 173.

(J) Not all classes have been cleared of art such as defined herein. This class, therefore has only such art as is cleared from other classes. Section III of the class definition indicates those classes which have bodies of art in conflict with the definitions of this class.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

If both the drive means and means to cause, control or selectively prevent advance comprise merely gear or mechanical motion elements as defined in Class 74, Machine Element or Mechanism, classification is in Class 74. However, if structure is claimed which goes beyond the scope of Class 74, such as specific motor structure, a vehicle support for the drive, work engaging

support means or means to adjust the position of the axis of tool advance, classification is in Class 173.

A motor vehicle having a power take-off of general utility, but which may be described as for the purpose of driving a tool is classifiable in Class 180, Motor Vehicles, particularly subclasses 53.1+. Therefore, to be included under (1) in G above, the means for driving a tool must include a structural feature of relationship which is peculiar to tool driving.

RELATIONSHIP TO SPECIFIC TOOL CLASSES

The claiming of specific work contacting tool structure in combination with subject matter of this class will cause original classification of the patent in the appropriate specific tool class, as will the claiming of plural, angularly related cooperating work contacting elements such as angularly related tools or a tool combined with an opposing support for the work. However, many of the specific tool classes have not been cleared as to original classification in accordance with this line, nor has complete cross-reference of subject matter been made. The classes which should be closely investigated when making a search for the subject matter provided for under this definition are as follows:

15, Brushing, Scrubbing, and General Cleaning

30, Cutlery

56, Harvesters

81, Tools

82, Turning

83, Cutting

125, Stone Working

142, Wood Turning

144, Woodworking

172, Earth Working

234, Selective Cutting (e.g., Punching)

408, Cutting by Use of Rotating Axially Moving Tool

433, Dentistry

451, Abrading

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus

MISCELLANEOUS SEARCH NOTES

The Search Notes below include statements of the line with classes having closely related art.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 12, Boot and Shoe Making, appropriate subclass for machines and processes of operating machines for making boots and shoes.
- 15, Brushing, Scrubbing, and General Cleaning, appropriate subclass for a cleaning device, and particularly subclasses 3+ for cleaning machines, including in subclasses 300.1+ such machines with air blast and/or suction.
- 16, Miscellaneous Hardware, subclasses 110+ for handles, including handles described as for the purpose of manipulating tool drives, and including handles having vibration dampening or absorbing means. If the handle is claimed in combination with a mere named tool drive, classification will be in Class 173 only if features relating to control of or energy supply for the tool drive are claimed.
- 29, Metal Working, appropriate subclass for metal working apparatus, and processes of operating same, and particularly subclasses 700+ for assembling and disassembling apparatus. See subclasses 243.53+ for riveting apparatus not elsewhere classified.
- 30, Cutlery, appropriate subclass for hand operated cutting tools, or hand manipulated, power operated cutting tools, and particularly subclasses 272.1+ for cutting tools having blade moving means.
- 37, Excavating, appropriate subclass for excavating devices having drive means, and including vehicles having driven excavating elements.
- 56, Harvesters, appropriate subclass for driven harvesting devices, and generally comprising such devices which are advanced by a land vehicle as they operate.
- 60, Power Plants, appropriate subclasses for motors which may include a named type of tool as a load for the motor, and also for plural motors of diverse types. If one motor is described as a tool drive means and another as

- tool advance means, the patent will be classified in Class 173.
- 72, Metal Deforming, subclasses 429+ for apparatus for driving a metal deforming tool.
- 74, Machine Element or Mechanism, appropriate subclass for a mechanical motion transmitting means, and including such means even though separate elements thereof are described as operating the drive, and causing or controlling the advance of a tool, such means merely being considered equivalent to mechanical movements or transmissions involving plural power paths. Class 74 also includes patents claiming a named type of motor, or plural named motors for imparting motion to a mechanical movement or transmission.
- 81, Tools, appropriate subclass for a drive device for an assembling tool, and particularly subclasses 463+ for an assembling tool with impact delivering means and subclasses 54+ for a machine wrench.
- 82, Turning, appropriate subclass for drive means and advance causing or controlling means used in a metal turning operation.
- 83, Cutting, appropriate subclass for a drive means or advance causing or controlling means used in a cutting operation.
- 91, Motors: Expansible Chamber Type, appropriate subclass for structure of a motor, or plural motors of that class. Class 91 includes a motor having a named type of tool as a load, however, a motor having impact device features as defined in section "D" of this definition a motor structure having a supplement specific passage to convey cleansing fluid to a tool, a motor described as for a tool drive and having specific structure of a manipulating handle, or plural motors, even though merely described as separately having feed and drive loads are classified in Class 173.
- 92, Expansible Chamber Devices, appropriate subclass for a device of that class for driving a tool. The line between Class 92 and Class 173 is the same as the line between Class 91 and Class 173.
- 104, Railways, subclasses 13+ for a railway track laying tamping tool, and subclass 17.1 for railway track laying spike drivers.
- 111, Planting, appropriate subclass for driven planting devices, and generally comprising such devices which are advanced by a land vehicle as they operate.
- 123, Internal-Combustion Engines, appropriate subclass for a motor of that type, even though a named type of tool is included as a load. The line between Class 123 and Class 173 is generally the same as between Class 91 and Class 173.
- 125, Stone Working, appropriate subclass for a drive means or advance causing or controlling means used in a stone working operation.
- 142, Wood Turning, appropriate subclass, for a drive means or advance causing or controlling means used in a wood turning operation.
- 144, Woodworking, for a drive means or advance causing or controlling means used in a wood-working operation.
- 172, Earth Working, appropriate subclass and particularly subclasses 35+ for a drive device for an earth working tool. Generally, such devices are advanced by a land vehicle as they operate. A described use as a drive for an agricultural earth working tool will cause classification in Class 172.
- 175, Boring or Penetrating the Earth, appropriate subclass for a tool drive means, advance causing or controlling means, impacting device or work cleansing means which is combined with specific structure of the work contacting portion of a tool, a fluid handling head adapted to seal in a bore entrance, or a bore wall engaging guide or packing device on the tool shaft, and subclasses 293+ for a below ground hammer or impact means, either combined with a specific earth boring tool or comprising a means forming a lost motion connection in a shaft or cable string, such means comprising relatively movable members which are provided with faces that impart each other to generate a "jar" which is transmitted by the rod or cable to a means connected thereto.
- 180, Motor Vehicles, appropriate subclass for a vehicle means which may be described as supporting a tool drive means, and particularly subclasses 53.1+ for a motor vehicle having a power take-off which may be described as for operating a tool driving or advancing means. If the power take-off does not include a structural feature or relationship that is more than of general utility, classification will be in Class 180.
- 181, Acoustics, subclass 230 for mufflers, per se, specifically adapted to pneumatic type motors.
- 227, Elongated-Member-Driving Apparatus, appropriate subclasses for a driver combined with a magazine for members, e.g., nails, clenching anvil or work support which would preclude classification in Class 173.

- 241, Solid Material Comminution or Disintegration, appropriate subclass for a drive means combined with a comminuting or disintegrating means.
- 267, Spring Devices, subclass 137, for a tool-movement-dampening spring device.
- 299, Mining or In Situ Disintegration of Hard Material, appropriate subclass and particularly subclasses 29+ for a machine having a specific tool described as for disintegrating hard material in situ. In general, claiming of specific tool structure is necessary to cause classification of a machine in Class 299, with the exception that Class 299 includes some large tunnel forming machines with material handling features and chain cutter driving, advancing and manipulating machines which do not necessarily recite specific tool structure.
- 310, Electrical Generator or Motor Structure, appropriate subclass for motor of that class, including such motors having a named type of tool as a load, and particularly subclass 50 for a dynamo-electric motor for a portable hand tool.
- 318, Electricity: Motive Power Systems, appropriate subclass for plural motors including a named type of tool as a load, and particularly subclass 39 for plural, diverse, or diversely controlled electric motors, in which such motors comprise work and feed motors.
- 404, Road Structure, Process, or Apparatus, subclasses 133.05+ for tamping means and see notes thereunder.
- 408, Cutting by Use of Rotating Axially Moving Tool, for (1) a tool-drive means combined with work-recognizing structure for use in the operation of that class (2) a tool-drive means combined with a specific tool of that class type, or (3) tool-drive means combined with significant "machine frame" structure generally limiting the drive to operation in a machine of that class. "Machine frame" structure is in addition, to the housing required to support the drive structure. Such "machine frame" structure may be significantly recited by physical limitations of the structure of by a named recitation of two or more parts of the structure including the interrelationship of the parts.
- 409, Gear Cutting, Milling, or Planing, appropriate subclasses for a drive means or advance causing means used in a gear cutting, milling, or planing operation.
- 415, Rotary Kinetic Fluid Motors or Pumps, appropriate subclass for a motor of that type for operating a tool, and particularly subclass 904, for a tool drive turbine.
- 418, Rotary Expansible Chamber Devices, for rotary expansible chamber devices, per se, and see the Note to Class 91 above for a statement of the line between this class (173) and Class 91, the line between Classes 91 and 418 being the same.
- 433, Dentistry, subclasses 103+ for power-driven dental tools, especially subclasses 118+ for power operated plugging instruments.
- 451, Abrading, subclasses 64+ for a machine for performing an abrading function, which machine also includes a drive means or an advance causing or controlling means which is used in the abrading operation.
- 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, appropriate subclasses for processes of operating machines for making articles of the class.

SECTION IV - GLOSSARY

ADVANCE

The forward movement of the tool into or along the work. Such movement is in addition to the drive movement (i.e., cyclic forward and backward or lateral motion of the tool). Included under this definition as apparatus functioning under the broad meaning of advance are means for causing, controlling, or selectively preventing the forward movement of the tool into or along the work.

CLEANSING

The act of removing matter resulting from the operation of the tool on the work.

CLEANSING FLUID

A fluid which is adapted to perform a cleansing function upon work. Such a fluid may be solely described as performing some other function, such as cooling the work, so long as it is directed in such a manner as to inherently cleanse the work.

DRIVE

The motion of a tool which performs a function upon work. Impact is included under the definition of this

term. Also, any means to cause the drive motion of a tool such as a motor, cooperating gearing or mechanical movement elements, or an impacting device.

HAMMER HEAD

The striking element of an impacting device.

IMPACTING DEVICE

A means including a mass of material (i.e., hammer head) which is specifically intended to deliver a blow to a tool. The mass of material need not necessarily strike the tool directly, but may deliver the blow through an intervening element (e.g., anvil).

IMPACTING

A type of drive function which includes striking a mass of material (e.g., tool) with another mass of material (e.g., hammer head).

MANIPULATING

Moving the tool drive from one place to another to perform a function upon work. This movement is separate from or in addition to the advance movement of the tool.

MANIPULATING HANDLE

A means specifically intended to be grasped by the hand or hands of an operator to move the tool drive, of which it forms a part, to different positions with respect to the work, and to be continually grasped by the operator as the tool advances in performing a function upon work.

MOTIVE FLUID

A fluid used to drive a motor, and including fluid taken from a stream supplying a motor, or from a stream exhausting from a motor. Fluid fuel for or fluid exhaust from a combustion motor is included under this definition.

TOOL

A work contacting element which functions to effect some physical alteration in the work, such as chipping or boring, but also includes other elements which are driven in the same manner as a tool such as a nail or post.

WORK

The object or mass of material which is contacted by the tool to be physically altered thereby.

SUBCLASSES

- 1 This subclass is indented under the class definition. Methods for operating tool driving or impacting devices to perform a function which is not limited by a manipulative step to a specific tool art.
 - (1) Note. This subclass is not intended to form a complete search for all described processes of operating tool driving or impacting devices as provided for under the class definition. Therefore, the search for process claims falling herein should be completed in the appropriate apparatus subclass.
- 2 This subclass is indented under the class definition. Apparatus comprising (1) means for sensing a condition or change of condition, which condition or change of condition may or may not occur, (2) a separate control means and (3) a separate power operated means to initiate, modify, or terminate the functioning of the apparatus, said three means being so related that the sensing means controls operation of the control means and the control means controls operation of the power means, all without the intervention of a human operator.
 - (1) Note. Apparatus wherein the driven tool constitutes the sensing means and controls the control means for the power operated means is included under this definition only if the control means moves relative to the driven tool. An apparatus having structure integral with or fixed to the tool as the sole means to control the operating means is not considered to be automatic, and is classified on other features.
 - (2) Note. A valve having one specific area which senses the condition of a fluid, and a completely different area which controls the flow of the same or a different fluid to operate as power means is included under this definition as separate sensing and control means. A valve which senses and controls with the same

surface (i.e., a check valve), is not included and is classified on other features.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 13+, for a drive controlled by relative axial movement of a tool.
- 18, for drive controlled by relative movement of advance causing or controlling means or manipulating handle.
- 58, for work cleansing controlled by relative movement between the drive and tool, advance causing or controlling means or manipulating means.

SEE OR SEARCH CLASS:

- 83, Cutting, subclasses 72+ for a cutting device having means to monitor a control operation.
- 172, Earth Working, subclasses 2+ for an earth working device having automatic power control.

- 3** This subclass is indented under subclass 2. Apparatus in which the sensing means senses the condition of (1) a specific modification of the tool drive which is for the purpose of removing unwanted material from the work face being operated on by the tool or (2) structure combined with the tool drive which functions to remove unwanted material from the work face being operated upon by the tool.

SEE OR SEARCH CLASS:

- 175, Boring or Penetrating the Earth, subclass 38 for automatic control of an earth boring means in response to drilling fluid circulation.

- 4** This subclass is indented under subclass 2. Apparatus in which the sensed condition of operation controls a power operated means to initiate, modify, or terminate the operation of the means to positively cause or progressively control the forward movement of the tool into or along the work.

SEE OR SEARCH CLASS:

- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 5+ and 8+ for a boring or drilling machine having automatic or tool position control of tool movement.

- 5** This subclass is indented under subclass 4. Apparatus in which the sensing means senses a condition of (1) force applied to the tool to drive the tool about an axis or (2) rate of motion of the drive means.

SEE OR SEARCH CLASS:

- 408, Cutting by Use of Rotating Axially Moving Tool, subclass 6 and 8+ for a drilling machine having torque or penetration resistance responsive control of a feed mechanism.

- 6** This subclass is indented under subclass 5. Apparatus in which the sensing means includes a means to also sense the condition of the means which causes or controls forward movement of the tool.

- 7** This subclass is indented under subclass 5. Apparatus in which means driving the tool comprises a motor, and the sensing means senses a condition of the motor power material or electric current.

SEE OR SEARCH CLASS:

- 318, Electricity: Motive Power Systems, subclass 39 for electrical work and feed motors which are interrelated.

- 8** This subclass is indented under subclass 7. Apparatus in which the drive motor power material comprises a fluid which operates a fluid motor (e.g., expansible chamber type motor or turbine).

- (1) Note. Included under this definition are those motors which derive power solely from the pressure or flow of a fluid stream. An internal combustion engine, for example, which may utilize a fluid fuel, but requires a chemical reaction to operate, is excluded from this definition.

- 9** This subclass is indented under subclass 5. Apparatus in which the means which causes or controls forward movement of the tool comprises a motor operated by fluid.

- (1) Note. Included under this definition are those motors which derive power solely from the pressure or flow of a fluid stream. An internal combustion engine,

for example, which may utilize a fluid fuel, but requires a chemical reaction to operate, is excluded from this definition.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

8, for automatic control of tool advance causing or controlling means in response to motive fluid pressure or current sensed torque or speed condition of a drive.

10 This subclass is indented under subclass 4. Apparatus in which the sensing means senses the distance of cyclic to and fro motion of a (1) hammer head or (2) tool.

11 This subclass is indented under subclass 2. Apparatus in which the power means comprises a drive means and the sensing means senses a condition of a means to positively cause or progressively control the forward movement of the tool into or along the work.

SEE OR SEARCH CLASS:

83, Cutting, subclass 76 for cutting means combined with means to monitor and control operation, including means to compensate tool speed for work-feed variations.

13 This subclass is indented under the class definition. Apparatus comprising a tool drive means and a tool or means to receive or retain a tool for actuation by the drive means, the tool or tool receiving or retaining means being adapted to move relative to the drive in a direction parallel to the axis of tool advance, said relative movement being adapted to initiate, modify, or terminate the operation of the tool drive means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

2+, for automatic control of power operated means.

93.5+, for a rotary tool drive in which torsional load causes relative movement between a drive element and a tool to cause delivery of torsional impact.

14 This subclass is indented under subclass 13. Apparatus in which the relative movement starts the operation of the tool drive by causing a reciprocating element of the tool drive to be

mechanically coupled to and directly operated by the pulsation or reciprocation of a confined mass of fluid.

15 This subclass is indented under subclass 13. Apparatus in which the tool is driven by a motor and the relative movement initiates, modifies or terminates the operation of the tool drive motor.

16 This subclass is indented under subclass 15. Apparatus in which the operation of the drive motor is initiated, modified, or terminated by a change in internal relationship of the parts of the motor.

17 This subclass is indented under subclass 16. Apparatus in which the tool drive motor is of the cyclically operable, expansible chamber type and the path of reciprocatory movement of a motor piston is altered relative to a port which supplies fluid to a working chamber of the motor or a fluid operated distributor motor.

18 This subclass is indented under the class definition. Apparatus comprising a tool drive means and a means to positively cause or progressively control the forward movement of the tool or a means specifically adapted to be engaged by the hand of the operator to manipulate the drive, and one of the latter means is adapted to move relative to the drive means to operate a means to initiate, modify, or terminate the operation of the tool drive means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

2+, for automatic control of power operated means.

13+, for drive controlled by relative axial movement of tool.

58, for work cleansing controlled by relative movement between drive and tool, advance causing or controlling means or manipulating handle.

19 This subclass is indented under the class definition. Apparatus comprising a means to positively cause or progressively control the forward movement of the tool into or along the work, and which is adapted to reverse the movement of the tool upon the tool reaching a predetermined position without the intervention of a human attendant.

SEE OR SEARCH CLASS:

- 83, Cutting, subclass 69 for cutting means combined with stopping means effective on completion of predetermined number of tool cycles.
- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 5+ for boring and drilling combined stopping means effective on completion of predetermined number of tool cycles; subclasses 10+ for automatic or tool position control of tool movement; subclass 17 for drive structure of that class to cyclically reciprocate the tool.
- 20** This subclass is indented under the class definition. Apparatus combined with a means to indicate or signal a condition or the occurrence of a condition to a human attendant.
- (1) Note. Means which signal or indicate are dials, graduations, horns, bells, etc., but a means to form a mere stop or single fixed reference point are not included under this definition and are classified on other features.
- SEE OR SEARCH CLASS:
- 340, Communications: Electrical, subclasses 500+ for electrical automatic condition responsive indicating systems.
- 21** This subclass is indented under subclass 20. Apparatus in which the means signals or indicates a position or condition of the forward movement of the tool into or along the work.
- 24** This subclass is indented under subclass 22. Apparatus in which the travel of the vehicle is utilized to positively cause forward movement of the tool into or along the work.
- SEE OR SEARCH CLASS:
- 56, Harvesters, appropriate subclass for a harvesting device, and generally including a harvesting device which is advanced by a vehicle while operating.
- 171, Unearthing Plants or Buried Objects, appropriate subclass for an unearthing device which is generally advanced by a vehicle while operating.
- 172, Earth Working, appropriate subclass, and particularly subclasses 35+ for a driven earth working tool, generally advanced by a vehicle while operating.
- 299, Mining or In Situ Disintegration of Hard Material, subclasses 29+ for a machine for disintegrating hard material in situ and which is generally carried on a vehicle.
- 25** This subclass is indented under subclass 22. Apparatus in which the means to power the transporting movement of the vehicle is provided with a mechanical power take-off to drive the tool.
- SEE OR SEARCH CLASS:
- 180, Motor Vehicles, subclasses 53.1+ for a motor vehicle in which the motor acts as an external source of power.
- 26** This subclass is indented under subclass 25. Apparatus in which the means to drive the tool includes gear means, and elements of the gear means are adapted to move relative to the power take-off of the vehicle to (1) adjust the axis of tool advance or (2) accommodate movement of the tool into or along the work.
- 27** This subclass is indented under subclass 22. Apparatus in which the same source of energy (e.g., current, pressure, fuel, etc.), motivates the power means for the vehicle and the tool drive.
- (1) Note. One of the power means may operate a pump or generator to supply pressure or current for the other power means.
- 28** This subclass is indented under subclass 22. Apparatus in which the supporting structure of the tool drive is constructed in such a manner as to adapt the tool drive to be moved from the position in which the tool normally works to a position which better facilitates transportation.
- SEE OR SEARCH CLASS:
- 52, Static Structures (e.g., Buildings), subclasses 111+ for a mechanism or relatively movable shaft assembly, e.g., a power erected tower and sub-

- class 143 for a residual building structure with a transportation feature.
- 29** This subclass is indented under the class definition. Apparatus in which means are provided to perform a tool drive function and a tool drive function in a different manner or a function other than tool driving after (1) removal of a significant portion of the apparatus (2) installation of additional parts or (3) substantial rearrangement of existing parts.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
47, for a drive which is adjustable to completely change the kind of drive motion.
- 30** This subclass is indented under the class definition. Apparatus combined with structure particularly adapted to be engaged by some portion of the body of a human, with the exception of the hands.
- 31** This subclass is indented under the class definition. Apparatus combined with the structure of means other than the tool, which is specifically adapted to engage the material upon which the work is being performed, said structure bearing the weight of the tool drive or resisting the reactive force of the means causing forward movement of the tool while the tool drive is operative.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
22+, for a work engaging vehicle support of a tool drive.
- SEE OR SEARCH CLASS:
248, Supports, subclasses 637+ for a machinery support.
- 32** This subclass is indented under subclass 31. Apparatus in which the work engaging means comprises a structure adapted to positively engage the material being worked at a point in the face being worked (e.g., the face perpendicular to the axis of tool advance), in such a manner as to resist reactionary movement of the means causing forward movement of the tool into the work.
- 33** This subclass is indented under subclass 32. Apparatus in which the axis of tool advance forms substantially the geometric center of points of engagement of the means which positively engages the work.
- 34** This subclass is indented under subclass 31. Apparatus in which the material being worked is engaged by the structure at opposed points, such as opposed positions on the walls of a shaft or tunnel.
- 35** This subclass is indented under subclass 34. Apparatus in which the drive is adapted to operate a tool to advance along an axis substantially perpendicular to a line extending between the opposed points of engagement.
- 36** This subclass is indented under subclass 31. Apparatus in which the structure engages the material being worked at a point opposite to the working point, generally being the opposed wall of a shaft or tunnel.
- 37** This subclass is indented under subclass 31. Apparatus in which the work engaging structure includes plural work engaging elements, and an element is adapted to be adjusted relative to the tool drive means and relative to another work engaging element.
- 38** This subclass is indented under the class definition. Apparatus having means to cause forward movement of the tool into or along the work comprising a lever, one end of which is mounted to pivot about a fixed or shifting point and the opposite end being connected to the tool or tool drive, the forward movement of the tool being substantially rectilinearly controlled by (1) shifting the pivot point or (2) directly guiding the tool or tool drive.
- 39** This subclass is indented under the class definition. Apparatus in which the tool drive means is adjustably connected to a substantially fixed structure (e.g., support), and means are provided to hold the tool drive means in different positions relative to the fixed structure to provide plural selective positions of the axis along which the driven tool moves forward into the work.

SEE OR SEARCH CLASS:

299, Mining or In Situ Disintegration of Hard Material, subclasses 29+ for a hard material disintegrating machine having means to adjustably manipulate a chain cutter or the like.

- 40** This subclass is indented under subclass 39. Apparatus in which the tool drive includes a source of power and a driven gearing element, and said gearing element being shifted bodily relative to the source of power in adjusting the axis along which the tool moves forward.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

26, for a vehicle support for a drive in which the vehicle motor operates the drive, and means are provided whereby drive gearing may be displaced relative to the vehicle motor.

- 41** This subclass is indented under subclass 40. Apparatus in which the tool drive includes plural driven gearing elements, and the gearing elements being relatively bodily shifted and each bodily shifted relative to the source of power in adjusting the axis along which the tool moves forward.

- 42** This subclass is indented under subclass 39. Apparatus in which plural separate adjustments are provided between the tool drive and fixed structure.

- 44** This subclass is indented under subclass 39. Apparatus in which a motor or mechanism is provided to move the tool drive to relatively adjusted position.

- 45** This subclass is indented under the class definition. Apparatus combined with means such as a template or element of predetermined length to locate an axis along which the driven tool will move forward into the work relate to a position in which the driven tool previously moved forward into the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

20+, for a tool drive means combined with signaling or indicating means.

- 46** This subclass is indented under the class definition. Apparatus combined with apparatus which is not included under the class definition and is not merely ancillary to the driving means, a means for advancing the tool, a tool drive manipulating means, or a work cleansing means.

- 47** This subclass is indented under the class definition. Apparatus including an adjustable drive means so constructed that the basic kind of motion imparted to the tool may be changed by manipulating a drive part (e.g., shifting gears in a transmission).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

29, for a drive means changeable from one basic drive motion to another which requires disassembly or assembly of parts.

- 48** This subclass is indented under subclass 47. Apparatus in which the drive means is adjustable to or from means to deliver an impact to a tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

93.5+, for a tool drive which rotates a tool under one torsional load condition and which rotary drive slips or yields under another torsional load condition to cause torsional impact to be delivered to the tool.

- 49** This subclass is indented under the class definition. Apparatus in which the tool drive means includes a mass which is driven about an axis, the axis of rotation being eccentric relative to the center of weight of the mass, said mass causing movement of an element which supports said axis of rotation when the center of weight of the mass reaches a certain position relative to the axis of rotation of the mass to drive the tool.

- (1) Note. The element which supports the axis of rotation of the mass generally (1) is guided against movement in other than line movement, and moves when the center of weight of the mass substantially corresponds with the guided line,

or (2) supports a pair of masses rotating in opposite directions, and said element moves when the combined centers of weight of the masses are unbalanced.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclass 61 for a mechanical movement including an unbalanced weight.

50 This subclass is indented under the class definition. Apparatus comprising a motor or drive element connected to plural power paths to simultaneously drive plural tools.

(1) Note. If the tools cooperate as a tool “gang” to perform a function requiring interaction upon the work, a claimed relative position of the tools is considered to define specific work engaging tool structure, and classification will be in the appropriate art class.

51 This subclass is indented under subclass 50. Apparatus in which at least two of the power paths include means to impart a rectilinear to and fro movement to a tool or the hammer head or an impact delivering device.

52 This subclass is indented under the class definition. Apparatus comprising plural separately operable tool drive means which are supported by a common rigid structure combined with a single advance causing or controlling means or manipulating means for the rigid structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

50+, for power paths to plural tools from single drive, which may include a single advance causing or controlling or manipulating structure.

53 This subclass is indented under the class definition. Apparatus in which a hammer head or tool includes a rod or rod like structure rigidly connected thereto, and the drive means includes means to grasp said rod or rod like structure, and a means to reciprocate the grasp means, said grasp means permitting the hammer head or tool to move forward relative to the reciprocatory path of the grasp means by (1) cyclic release by the rod or rod like means by the grasp means or (2) relative slippage

between the grasp means and rod or rod like means as the work progresses.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 429+ for a tool driving means in a metal shaping machine, especially subclasses 431+ for a yieldable connection and subclasses 435+ for a “drop-hammer”.

54 This subclass is indented under subclass 53. Apparatus in which during each cycle of reciprocation the grasp means engages a stationary structure to cause the grasp means to release or slip the rod or rod like means to permit the hammer head or tool to move forward as the work progresses.

55 This subclass is indented under subclass 54. Apparatus in which cyclic engagement of the grasp means with the stationary structure positively releases the grasp means from the rod or rod like structure.

56 This subclass is indented under subclass 53. Apparatus in which the grasp means, or means causing reciprocatory movement thereof, simultaneously causes the rod or rod like means to rotate or oscillate during each cycle of reciprocation of the grasp means.

58 This subclass is indented under subclass 57. Apparatus in which the operation of work cleansing is initiated, modified, or terminated by relative movement between the tool drive and (1) the tool, (2) the means to positively cause or progressively control the forward movement of the tool or (3) a means specifically adapted to be engaged by the hand of the operator to manipulate the drive.

SEE OR SEARCH THIS CLASS, SUBCLASS:

18, for drive controlled by relative movement of advance causing or controlling means or manipulating handle.

59 This subclass is indented under subclass 57. Apparatus in which the cleansing is performed by fluid derived from a motive fluid stream supplied to or exhausted from a drive motor or an advance causing or controlling motor.

- (1) Note. The motive fluid supply to or fluid exhaust from any type motor is included under this definition, including fluid exhaust from an internal combustion motor, which may utilize solid fuel for an energy supply, but exhausts a fluid.
- 60** This subclass is indented under subclass 59. Apparatus in which the motive fluid stream does not contact the work face, but is provided with means to induce flow of an ambient fluid (e.g., a venturi) to cause the ambient fluid to circulate over and cleanse the work face.
- 61** This subclass is indented under subclass 59. Apparatus in which a means is provided to utilize a fluid from a nonmotor source for cleansing, as well as a fluid derived from the supply or exhaust of the motor.
- 62** This subclass is indented under subclass 61. Apparatus in which means are provided to selectively control the supply of both fluids, whereby either one of the fluids may be separately admitted to the work face.
- 63** This subclass is indented under subclass 61. Apparatus in which means are provided to derive motive fluid to be utilized for cleansing from the stream which supplies the motor, before the fluid passes into a motor chamber.
- 64** This subclass is indented under subclass 59. Apparatus including means which are provided to derive motor fluid to be utilized for cleansing from the stream which supplies the motor, before the fluid passes into a motor chamber.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
63, for the use of motive fluid for cleansing which bypasses a motor chamber, in which cleansing fluid from an additional source is also utilized.
- 65** This subclass is indented under subclass 64. Apparatus having the means which controls the rate of flow of motive fluid to the motor chamber said means being provided with additional structure to control the supply of motive fluid which is to be utilized for cleansing.
- 66** This subclass is indented under subclass 59. Apparatus in which the drive motor comprises a cyclically operable reciprocating type expandable chamber fluid motor, and a specific modification of the motor is provided whereby the motor may be controlled to stop operation and simultaneously continuously direct the flow of the motive fluid stream through one working chamber of the motor for direction upon the work to perform a cleansing function.
- 67** This subclass is indented under subclass 66. Apparatus in which the cyclically operable motor includes a relatively movable motive fluid distributor, and means are provided to stop relative movement of the distributor during the continuous flow of motive fluid through one working chamber.
- 68** This subclass is indented under subclass 67. Apparatus in which the motor is provided with a throttle valve controlling the inlet of motive fluid, and the throttle valve is adapted either by direct engagement or through a linkage to stop relative movement of the distributor for the purpose of maintaining cleansing fluid supply through one working chamber.
- 69** This subclass is indented under subclass 67. Apparatus in which the motor is provided with a throttle valve to control the exhaust of motive fluid from the motor, and actuation of said valve to control exhaust also functions to stop the distributor and maintain cleansing fluid supply through one working chamber.
- 70** This subclass is indented under subclass 67. Apparatus in which a mechanical means is provided to stop relative movement of the distributor while cleansing fluid is continuously supplied through one working chamber.
- 71** This subclass is indented under subclass 59. Apparatus in which means are provided for the purpose of preventing unwanted material (such as material removed from the work face) from entering the motor through a cleansing fluid passage.
- 72** This subclass is indented under subclass 59. Apparatus in which the motive fluid for cleansing is exhausted from a motor which causes or controls advance.

- 73** This subclass is indented under subclass 59. Apparatus having means to direct the motive fluid into a passage in a tool or tool shaft, from which passage the fluid is directed upon the work face.
- 74** This subclass is indented under subclass 57. Apparatus in which means are provided to selectively or simultaneously utilize fluids from separate supplies for cleansing.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 60, for motive fluid caused flow of another fluid to cleanse the work.
- 61+, for motive fluid cleansing in which fluid from an additional source is also provided for the purpose of cleansing.
- 75** This subclass is indented under subclass 57. Apparatus in which the tool drive means pumps or mechanically drives a pump means to pressurize or cause circulating of a fluid material which performs a cleansing function.
- 76** This subclass is indented under subclass 75. Apparatus in which the pump means to pressurize or cause circulation of the fluid material comprises the hammer head or impact transmitting anvil of an impacting device.
- 77** This subclass is indented under subclass 57. Apparatus in which the fluid material for cleansing is controlled by an element which also controls the drive means or advance causing or controlling means.
- 78** This subclass is indented under subclass 57. Apparatus in which the mass of material which comprises the hammer head of an impacting device is provided with a passage which is specifically described as for the purpose of conveying fluid cleansing material.
- 79** This subclass is indented under subclass 57. Apparatus in which structure necessary to the operation of a tool drive motor, or advance causing or controlling motor is provided with a passage which is specifically described as for the purpose of conveying fluid cleansing material.
- 80** This subclass is indented under subclass 57. Apparatus in which a mass of material which is adapted to transmit an impact from a hammer head to a tool is provided with a specific passage which is described as for the purpose of conveying fluid cleansing material.
- 81** This subclass is indented under the class definition. Apparatus comprising the combination of means to cause reciprocation of a hammer head or tool by a cable, or similar flexible element, and a means to control the cable for the purpose of controlling the forward movement of the path of reciprocatory movement of the hammer head or tool.
- (1) Note. The means to reciprocate and cause forward movement of the hammer head or tool may comprise a common element such as a cable drum which oscillates to reciprocate the hammer head or tool, while progressively rotating to control the forward movement of the hammer head or tool.
- (2) Note. These devices are commonly known as "Cable Tool Rigs", in the well drilling and pile driving arts.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 53+, for a hammer or tool shaft reciprocated by a gripping means which releases or yields to permit advance.
- SEE OR SEARCH CLASS:
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 264+ for apparatus for hauling or hoisting a load including a driven device which contacts and pulls on a cable.
- 82** This subclass is indented under subclass 81. Apparatus in which the means to reciprocate the hammer head or tool cyclically actuates a means to control forward movement of the hammer head or tool so that the advance is only permitted at a certain point in each cycle of reciprocation.

- 83** This subclass is indented under subclass 81. Apparatus in which the means to control forward movement of the hammer head or tool is bodily reciprocated by a separate means which causes the reciprocation of the hammer head or tool.
- 84** This subclass is indented under subclass 81. Apparatus in which means are provided to cyclically release the driving connection between the cable, or similar flexible element, and the hammer head or tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
55, for a hammer or tool shaft reciprocated by gripping means which release or yield to permit advance, and in which contact with a fixed structure moves the grips out of shaft engagement.
- 85** This subclass is indented under subclass 81. Apparatus including at least two drums which receive plural turns of cable.
- (1) Note. For inclusion under this definition, at least one of the drums must be claimed as part of a combination to reciprocate and control forward movement, while the other drum may be completely independent of the combination.
- 86** This subclass is indented under subclass 81. Apparatus in which a structure is provided to support the cable or similar flexible element against gravity at a relatively elevated point between the means causing the cable or similar flexible element to reciprocate, and the hammer head or tool.
- 87** This subclass is indented under subclass 86. Apparatus in which the means causing the cable or similar flexible element to reciprocate comprises a drum receiving plural turns of the cable, the drum being oscillated about an axis to cause the reciprocation.
- 88** This subclass is indented under subclass 86. Apparatus in which the means causing the reciprocation of the cable comprises a cable engaging element which is oscillated.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
87, for an oscillating cable drum which causes reciprocation of a cable operated hammer or tool.
- 89** This subclass is indented under subclass 88. Apparatus in which the drive to the oscillating cable engaging element is cyclically disconnected to permit the hammer head or tool to substantially freely drop under the sole influence of gravity.
- 90** This subclass is indented under the class definition. Apparatus comprising a mass of material (i.e., hammer head) which is specifically intended to deliver a blow to a tool.
- (1) Note. Included under this definition are means to transmit an impact from a hammer to a tool (e.g., an anvil).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
48, for a drive adjustable to completely change kind of drive, in which the drive is adjustable to function as an impacting device.
51, for power paths to plural tools from single drive, in which at least one of the tools is driven by an impacting device.
53+, for a hammer head or tool shaft reciprocated by gripping means which release or yield to permit advance.
78, for a cleansing fluid passage through the hammer head of an impacting device.
81+, for means to control advance and cyclically reciprocate a cable operated hammer or tool.
- SEE OR SEARCH CLASS:
7, Compound Tools, subclasses 143+ for hand type hammers combined with other tools.
72, Metal Deforming, subclasses 435+ for a "drop-hammer" driving means in a forging press.
74, Machine Element or Mechanism, appropriate subclass for a mechanical movement or gearing for operating a hammer head.

- 81, Tools, subclasses 463+ for tools combined with impact delivering means, and subclasses 20+ for hand type hammers.
- 104, Railways, subclasses 10+ for track laying tampers, and subclass 17.1 for track laying spike drivers.
- 175, Boring or Penetrating the Earth, subclass 135 for an above ground impacting device combined with a specifically claimed earth boring or penetrating tool and subclasses 293+ for hammer or impact means located below ground in an earth bore, either combined with a specific earth boring feature or comprising a means forming a lost motion connection in a shaft or cable string, such means comprising relatively movable members which are provided with faces that impact each other to generate a "jar". See the class definition of Class 175, sections I, C and IV B.
- 227, Elongated-Member-Driving Apparatus, appropriate subclass for a driver, e.g., hammer, having a member, e.g., nail, staple, etc., engaging feature.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 18+ for a nail-extractor type puller combined with a hammer head structure.
- 299, Mining or In Situ Disintegration of Hard Material, subclasses 69+ for a hard material disintegrating machine operating a specifically claimed percussive type cutter.
- 404, Road Structure, Process, or Apparatus subclasses 133.05+ for tamping means and see notes thereunder.
- 91** This subclass is indented under subclass 90. Apparatus in which the hammer is selectively operable to deliver impacts in axially opposed directions.
- 92** This subclass is indented under subclass 90. Apparatus including a means to mechanically clutch and release the tool or tool shaft during each cycle of operation of the hammer.
- 93** This subclass is indented under subclass 90. Apparatus including an anvil which is related to a hammer head in such a manner as to transmit a blow from a hammer to the tool to rotate the tool about an axis.
- SEE OR SEARCH CLASS:**
- 81, Tools, subclasses 463+ for a tool combined with torsional impact delivering means.
- 192, Clutches and Power-Stop Control, appropriate subclass for a clutch which may be suddenly applied to cause a torsional impulse and particularly subclasses 3.21+ for a vortex-flow drive and clutch.
- 93.5** This subclass is indented under subclass 93. Apparatus in which driving means for the hammer head rotates the tool without impact under one torsional load condition and includes means which release or yield under a different torsional load condition whereby the hammer head delivers a blow to the anvil to cause rotary movement of the tool.
- SEE OR SEARCH THIS CLASS, SUBCLASS:**
- 48, for a tool drive which is selectively adjustable to completely change the type of tool drive from rotary to impact.
- SEE OR SEARCH CLASS:**
- 464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 30+ for rotary displacement between a shaft and a driven member occurring upon imposition of excessive torsional load.
- 93.6** This subclass is indented under subclass 93.5. Apparatus in which the hammer head reciprocates on a line coincident with or parallel to the axis of rotation of the tool.
- 93.7** This subclass is indented under subclass 93. Apparatus in which the anvil is adapted to transmit a tool rotating blow from a hammer head which is limited to rectilinear movement along or parallel to the axis of rotation of the tool.
- SEE OR SEARCH THIS CLASS, SUBCLASS:**
- 109+, for an impacting device having a hammer head delivering rectilinear impact

- to the tool in which the tool is rotated by the hammer head or drive for the hammer head.
- 94** This subclass is indented under subclass 90. Apparatus in which the hammer, or a portion thereof, travels substantially upon some portion of a path generated by a point moving at a constant distance about a relatively fixed axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
93+, for a hammer having an anvil arranged to transmit torsional impact to a tool, the hammer normally being moved about an axis.
- SEE OR SEARCH CLASS:
72, Metal Deforming, subclass 406 for a "rocking" tool in a metal shaping machine.
- 95** This subclass is indented under subclass 94. Apparatus in which the hammer reciprocates on a path coincident with or parallel to the axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
93.6, for a hammer having an anvil arranged to transmit torsional impact to a tool having rotary drive with torque responsive impact and in which the hammer reciprocates along the rotary axis.
- 96** This subclass is indented under subclass 95. Apparatus in which means are provided to selectively release or vary the movement in the path generated about an axis without stopping or changing the reciprocation in the path coincident with or parallel to the axis.
- 97** This subclass is indented under subclass 95. Apparatus in which the hammer is coupled to the tool to cause the tool to move in the path generated about an axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
96, for a hammer head which rotates and reciprocates, in which means are provided to selectively release or vary rotation, generally such rotation being transmitted to the driven element.
- 98** This subclass is indented under subclass 94. Apparatus including means for permitting or causing the hammer to detour from the path generated about an axis, this movement being usually for permitting the hammer to clear the tool or anvil after the delivery of a blow thereto.
- 99** This subclass is indented under subclass 98. Apparatus in which the hammer detours from the path generated about an axis by moving in a second path generated about an axis.
- 100** This subclass is indented under subclass 94. Apparatus in which the hammer cyclically reverses direction of movement in the path generated about an axis.
- 101** This subclass is indented under subclass 90. Apparatus in which the hammer includes plural relatively movable impacting heads which are adapted to alternately impart cyclic impacts to a tool.
- (1) Note. The impacting heads do not necessarily directly impact the tool but may impact one another or a common anvil.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
51, for power paths from a single drive to plural hammer heads or tools.
94+, for an impacting device having a hammer head which moves in an arcuate path, and including such devices having plural hammer heads.
- 102** This subclass is indented under subclass 101. Apparatus in which one impacting head imparts impact to a tool by striking another impacting head.
- 103** This subclass is indented under subclass 101. Apparatus in which the relatively movable impacting heads are arranged in such a manner that a common line passes through the geometric centers of both heads.
- 104** This subclass is indented under subclass 90. Apparatus including means to cause the tool to move about an axis.

- 105** This subclass is indented under subclass 104. Apparatus in which the tool is moved about an axis by a motor which does not drive the hammer head.
- 106** This subclass is indented under subclass 105. Apparatus in which the hammer head is driven by a fluid motor and means are provided to convey fluid which has been utilized in a fluid motor which causes the tool to move about an axis to the second motor which drives the hammer head, said fluid being further utilized as motive fluid in said second motor.
- 107** This subclass is indented under subclass 105. Apparatus in which the hammer head is driven by a fluid motor and means are provided to convey the fluid which has been utilized in the hammer head driving motor to a fluid motor which causes the tool to move about an axis, said fluid being further utilized as motive fluid in said second motor.
- 108** This subclass is indented under subclass 105. Apparatus in which the motor which causes the driven element to move about an axis is provided with a working member which cyclically moves to and fro.
- 109** This subclass is indented under subclass 104. Apparatus in which means are provided to transmit movement of the hammer head or the means driving the hammer head to the tool for the purpose of moving the tool about an axis.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
93+, for an impacting device having an anvil arranged to transmit torsional impact to a tool.
- 110** This subclass is indented under subclass 109. Apparatus in which the tool is moved about an axis step by step or cyclically reversed.
- 111** This subclass is indented under subclass 110. Apparatus in which the hammer head comprises an element in the drive train for moving the tool about an axis.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
97, for an impacting device having a hammer head that reciprocates and moves about an axis, and in which the movement about an axis is transmitted to the tool.
- 112** This subclass is indented under subclass 90. Apparatus including a means to positively cause or progressively control the forward movement of the hammer head in driving the tool into or along the work, such motion being in addition to the regular impacting motion of the hammer head.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
141, and see the search notes therein for an advance causing or controlling means for a tool or tool drive.
- 113** This subclass is indented under subclass 112. Apparatus in which the means for positively causing or progressively controlling the forward movement of the hammer head is actuated by (1) mechanical connection to the hammer head or drive therefor or (2) pulsations caused by the cyclic impacts or reversal of direction of the hammer element or a drive element therefor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
142+, for an advance causing or controlling means operated solely by vibrations from the reciprocating element in a tool drive means.
144, for an advance causing or controlling means in which reciprocatory drive and advance originate from the same mechanical element.
- 114** This subclass is indented under subclass 90. Apparatus including an additional means to reciprocate the tool.
- 115** This subclass is indented under subclass 90. Apparatus including means selectively operable to change the distance that the hammer head moves in delivering an impact.

- 117** This subclass is indented under subclass 90. Apparatus in which the motion of the hammer head is caused by an electric motor.

SEE OR SEARCH CLASS:

- 310, Electrical Generator or Motor Structure, appropriate subclass for an electric motor, including a hammer head claimed as a mere load, and particularly subclass 50 for a dynamo-electric rotary portable or hand tool motor.
- 318, Electricity: Motive Power Systems, subclass 114 for an impact, mechanical shock or vibration producing electric motor system.

- 118** This subclass is indented under subclass 90. Apparatus in which a resilient member is arranged to transmit force to a hammer head, and said member moves in entirety during each stroke of the hammer head.

- (1) Note. A fluid spring is included as a resilient element for purposes of this definition.

- 120** This subclass is indented under subclass 119. Apparatus in which a means is included to selectively vary the degree to which the resilient element is strained.

- 121** This subclass is indented under subclass 119. Apparatus in which the recoil of the resilient element retracts the hammer head from delivering a blow.

- 122** This subclass is indented under subclass 90. Apparatus in which the means transmitting drive motion from a source of power to the hammer head includes an element which cyclically moves relative to the hammer head.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 53+, for a hammer or tool shaft reciprocated by gripping means which release or yield to permit advance.
- 81+, for means to control advance and cyclically reciprocate a cable operated hammer or tool.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, appropriate subclass for a mechanical movement or gearing of general utility, and including a hammer head as a nominal load.

- 124** This subclass is indented under subclass 122. Apparatus in which the hammer head and motion transmitting element are coupled and uncoupled during each blow delivering cycle of movement of the hammer head.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 53+, for a hammer or tool shaft reciprocated by gripping means which release or yield to permit advance.
- 84, for a means to control advance and cyclically reciprocate a cable operated hammer or tool, in which the hammer or tool is cyclically disconnected from the cable.

- 125** This subclass is indented under subclass 90. Apparatus in which the mass of material which forms the hammer head includes an internal chamber which receives the piston of a motor, said internal chamber being adapted to receive motive material to cause the mass of material to move relative to the piston and deliver a blow.

SEE OR SEARCH CLASS:

- 91, Motors: Expansible Chamber Type, subclasses 196+ for an expansible chamber motor in which the cylinder necessarily moves, and including a moving cylinder which may be recited as a hammer head.
- 92, Expansible Chamber Devices, subclasses 117+ for a moving cylinder, and including a move cylinder which may be recited as a hammer head.
- 123, Internal-Combustion Engines, subclasses 52.1+ for an internal combustion engine having a moving cylinder, and including a moving cylinder which may be recited as a hammer head.

- 126** This subclass is indented under subclass 90. Apparatus in which the hammer head is composed of (1) at least two separate elements or (2) at least two separate materials.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
118, for a hammer head having a spring bodily cyclically moved therewith.
- 127** This subclass is indented under subclass 126. Apparatus in which the hammer head comprises or is rigidly connected to a mass of material forming an element which is received in a chamber, said element having surface which is acted upon by motive material in the chamber to cause the element to move and deliver a blow.
- SEE OR SEARCH CLASS:
92, Expandible Chamber Devices, subclasses 172+ for the piston of an expandible chamber device which is formed of specific or diverse materials, and including a piston which may be recited as a hammer head.
- 128** This subclass is indented under subclass 90. Apparatus comprising a mass of material which receives the direct blow from the hammer and transmits the blow to the tool or tool shaft.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
76, for a cleansing fluid pump which comprises a hammer head or impact transmitting anvil.
80, for an impact transmitting anvil provided with a cleansing fluid passage.
93+, for an impact drive having an anvil arranged to transmit torsional impacts to a tool.
- SEE OR SEARCH CLASS:
72, Metal Deforming, subclasses 476+ for an "anvil" tool in or for a metal shaping machine.
405, Hydraulic and Earth Engineering, subclasses 245+ for anvils for driving hollow piles which are provided with a wall supporting core portion.
- 129** This subclass is indented under subclass 128. Apparatus in which the impact transmitting mass of material is specifically adapted to be attached at more than one point to the tool or tool shaft in a direction parallel to the path of travel of the hammer head.
- 130** This subclass is indented under subclass 128. Apparatus in which the impact transmitting mass of material is specifically adapted to engage a tool or tool shaft of a specific shape, other than circular in cross-section, at the location of engagement.
- 131** This subclass is indented under subclass 128. Apparatus in which the impact transmitting mass of material comprises structure arranged such that the impact is transmitted through (1) separate parts or (2) specified different materials.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
93.7, for an anvil means which translates longitudinal impact relative to a tool shaft to impact in a torsional direction, and which may comprise plural parts.
- 132** This subclass is indented under subclass 128. Apparatus in which the impact transmitting mass of material is provided with means to provide a direct and positive connection to the tool or tool shaft.
- SEE OR SEARCH CLASS:
279, Chucks or Sockets, appropriate subclass for means to attach an anvil to a tool and particularly subclasses 19+ for a socket type, lost motion tool retainer.
- 133** This subclass is indented under subclass 128. Apparatus in which the impact transmitting mass of material is arranged relative to the tool in such a manner as to permit relative movement between said mass and said tool.
- 135** This subclass is indented under subclass 134. Apparatus in which fluid motive material is applied to cause movement of the element, upon the surface of the element that strikes the blow.

- 136** This subclass is indented under subclass 135. Apparatus in which the surface of the element which strikes the blow is provided with a port through which fluid motive material is supplied.
- 137** This subclass is indented under subclass 135. Apparatus in which the total area of the surface of the element to which fluid motive material is applied is greater than the area of the surface that strikes the blow.
- 138** This subclass is indented under subclass 134. Apparatus in which a passage or port is provided to conduct fluid motive material to or from the surface of the element that strikes the blow, generally for the purpose of cooling, lubrication or the removal of leakage motive fluid.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 135+, for a hammer head which constitutes the piston of a drive motor, in which motive fluid is applied to the striking face.
- 140** This subclass is indented under the class definition. Apparatus comprising a relatively fixed source of power for driving a tool and cooperating mechanical motion converting elements for transmitting the power from the source to the tool, said cooperating mechanical motion converting elements advancing with the tool and relative to the source of power.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 26, for a vehicle having a motor mechanically coupled to drive a tool, and in which drive gearing is displaced relative to the vehicle motor.
 40+, for means to adjust the position of the axis of tool advance, in which drive gearing is displaced relative to a source of power.
- 141** This subclass is indented under the class definition. Apparatus comprising a means to positively cause or progressively control the forward movement of the tool into or along the work, such movement being in addition to a cyclic forward and backward or lateral motion of the tool.
- (1) Note. The forward movement and cyclic motion of the tool may be caused by the same power source or by a different power source.
- (2) Note. For classification under this definition the means to positively cause or progressively control forward movement of the tool must be adapted to urge or resist forward movement continuously during the forward movement of the tool. Means which are adapted merely to stop the advance at specific points are classified on other features.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 4+, for automatic control of tool advance causing or controlling means.
 11, for automatic control of drive means in response to sensed condition of advance causing or controlling means.
 19, for a means to advance the tool through a self acting advance and retraction cycle.
 24, for running gear structure of a vehicle support for the tool drive, in which the movement of the vehicle causes the tool to advance.
 38, for a swinging arm advance causing means with the drive means guided to rectilinear advance.
 52, for a single advance or manipulating structure for plural tool drives.
 53+, for a grip drive to cyclically reciprocate a tool and permit advance.
 58+, for work cleansing controlled by relative movement between the advance causing or controlling means and the drive.
 59+, for work cleansing by fluid for advance causing or controlling motor.
 77, for cleansing fluid controlled by control for advance causing or controlling means.
 81+, for a means to control advance and cyclically reciprocate a cable operated tool.
 112+, for an impacting device combined with a means to cause or control advance of a hammer head.

165+, for a relatively fixed means to drive an advancing tool about an axis combined with a means to stop relative tool advance.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, appropriate subclass for a mechanical movement or transmission to cause or control advance or drive a tool, and particularly subclasses 829+ for constant length alternation stroke with means operable during motion to displace the end limits, and subclasses 840+ for a rotary driven device with means operable during motion to adjust the position of the device relative to its supporting structure.
- 83, Cutting, subclasses 401+ for means to convey work relative to a cutting station.
- 142, Wood Turning, subclass 47 for a carriage feed for a wood turning tool.
- 144, Woodworking, for a feed means for a wood working machine.
- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 129+ for a drilling machine with a feed mechanism.

142 This subclass is indented under subclass 141. Apparatus in which the means to cause or control forward movement of the tool operates with no power input other than pulsations resulting from the cyclic change of direction of movement of an element of the tool drive means, which element moves to and fro in a substantially rectilinear path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 49, for tool drive by means reacting to a rotating eccentric mass.
- 113, for an impacting device including a means to advance a hammer in which the advance may be operated by hammer vibrations.

143 This subclass is indented under subclass 142. Apparatus in which the movement resulting from the pulsations causes an element of the means moving the tool forward to move unidirectionally step by step about an axis.

144 This subclass is indented under subclass 141. Apparatus in which one mechanical motion converting element transmits motion from a source of power to cause cyclic to and fro rectilinear motion of a tool and to simultaneously cause or control forward movement of the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 53+, for a hammer or tool shaft reciprocated by gripping means which release or yield to permit advance.
- 81+, for means to control advance and cyclically reciprocate a cable operated tool.
- 142+, for advance causing or controlling means operated solely by vibrations from reciprocating element in tool drive.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclass 829 for a constant length alternating stroke with means to displace the end limits.

145 This subclass is indented under subclass 141. Apparatus in which one mechanical motion converting element transmits movement from a source of power to drive the tool by rotating the tool about an axis and to simultaneously cause or control forward movement of the tool.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclasses 840+ for a rotary driven device with means to adjust during operation the position of the device relative to its supporting structure.
- 175, Boring or Penetrating the Earth, subclasses 113+ for an earth boring tool combined with means to feed and rotate the tool from a single mechanical element.
- 408, Cutting by Use of Rotating Axially Moving Tool, subclasses 129+ for a drilling machine with a feed mechanism.
- 414, Material or Article Handling, subclasses 431+ for apparatus for advancing and rotating an elongated article by means adapted to engage the article between its ends.

- 146** This subclass is indented under subclass 145. Apparatus in which the means connecting the mechanical motion converting element to the means to cause tool rotation or cause or control forward movement is provided with (1) a clutch having frictionally engaging elements or (2) a coupling which yields without breaking the drive train in response to the imposition of an excessive torque load.
- 147** This subclass is indented under subclass 141. Apparatus in which force to cause forward movement of the tool is imparted to the tool or tool drive through an easily bendable element which in normal operation is repeatedly curved and straightened such as a belt, cable, chain, etc.
- SEE OR SEARCH CLASS:
299, Mining or In Situ Disintegration of Hard Material, subclasses 47+ for a side wall working mining machine having a driven flexible member which causes advance of the machine.
- 148** This subclass is indented under subclass 141. Apparatus in which the tool drive remains substantially axially fixed during operation while the tool axially moves forward relative thereto.
- 149** This subclass is indented under subclass 148. Apparatus in which the means to cause or control forward movement of the tool includes structure adapted to engage the tool or tool shaft at any point along the axial extent thereof, whereby the axial extent of the forward movement of the tool or tool shaft is not limited by the advance stroke of said advance means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
53+, for a grip drive which reciprocates a hammer or tool and permits relative advance.
- SEE OR SEARCH CLASS:
226, Advancing Material of Indeterminate Length, appropriate subclass for a means for advancing an element of indeterminate length.
- 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 29+ for pipe and rod jacks, and including devices which are adapted to advance a pipe or rod by grasping the pipe or rod at any point.
- 414, Material or Article Handling, subclasses 431+ for apparatus for advancing and rotating an elongated article by means adapted to engage the article between its ends.
- 150** This subclass is indented under subclass 148. Apparatus in which the means to cause or control forward movement of the tool includes a motor having a moving power applying member which during operation is adapted to move forward upon an axis substantially coaxial with the axis upon which the tool is moving forward.
- 151** This subclass is indented under subclass 148. Apparatus comprising a means to coil or otherwise drive a cable or similar flexible element which is connected to the tool to control forward movement of the tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
81+, for a means to advance and cyclically reciprocate a cable supporting a tool.
147, for a cable means to forcibly advance a tool.
- SEE OR SEARCH CLASS:
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 264+ for apparatus for hauling or hoisting a load which includes a driven device which contacts and pulls on a cable.
- 152** This subclass is indented under subclass 141. Apparatus in which the means for causing or controlling forward movement of the tool includes a motor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
59+, for work cleansing by motive fluid for the drive motor or advance causing or controlling motor.

- 79, for a cleansing fluid passage provided in an advance causing or controlling motor.
- 142+, for advance causing or controlling means operated solely by vibrations from a reciprocating element of a means causing drive motion of a tool, said reciprocating element usually being a motor or motor driven.
- 144, for reciprocatory drive motion and advance which originates from the same mechanical element, said element usually being motor driven.
- 145+, for rotary drive motion and advance which originate from the same mechanical element, said element usually being motor driven.
- 153** This subclass is indented under subclass 152. Apparatus in which the motor for causing or controlling forward movement is a fluid motor and in which the tool is driven by a separate fluid motor, the motive fluid exhausted by the drive motor being utilized as motive fluid in the motor causing or controlling forward movement.
- 154** This subclass is indented under subclass 152. Apparatus in which the tool is driven by a separate motor, and the separate motor also operates a means (e.g., a pump or generator), to produce a supply of motivating energy for use by the motor which causes or controls forward movement of the tool.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 27, for a tool drive combined with running gear structure of a vehicle support for a tool drive in which the vehicle drive motor actuates a means to generate tool drive or advance motivating energy.
- 155** This subclass is indented under subclass 152. Apparatus in which the motor for causing or controlling forward movement is a fluid motor and in which the tool is driven by a separate fluid motor, the motive fluid exhausted by the motor causing or controlling forward movement being utilized as motive fluid in the drive motor.
- 156** This subclass is indented under subclass 152. Apparatus combined with a lock or brake operable at least one point between the limits of a complete forward movement stroke to inhibit or prevent the tool from moving forward.
- (1) Note. The lock or brake may be operable while the motor is causing or controlling forward movement, or may only operate while the motor is stopped or disconnected.
- (2) Note. The “complete forward movement stroke” is the distance that the tool may move forward without stopping or altering the operation of the forward movement causing or controlling means, therefore, structure which functions to lock or brake forward movement at merely the beginning or end of such a stroke is not classified under this definition.
- 157** This subclass is indented under subclass 152. Apparatus in which the tool is driven by a separate motor, and a single element is provided to start and stop or regulate the flow of motivating energy to both the drive motor and the motor for causing or controlling forward movement of the tool.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 153, for a means for causing or controlling advance in which drive motor exhaust is motive fluid for an advance motor.
- 154, for a means for causing or controlling advance in which the drive motor generates advance motor motive energy.
- 155, for a means for causing or controlling advance in which the advance motor exhaust is motive fluid for a drive motor.
- 158** This subclass is indented under subclass 157. Apparatus in which an additional, separately movable means to start and stop or regulate the flow of motivating energy to the motor for causing or controlling forward movement of the tool is provided to control said motor independently of the drive motor.

159 This subclass is indented under subclass 152. Apparatus in which the tool is driven by a separate motor, and a supply of motivating energy flows from one source to both the drive motor and the motor for causing or controlling forward movement of the tool.

160 This subclass is indented under subclass 152. Apparatus in which an element is moved relative to both basic motor structure and the tool for transmitting motion to the tool to cause or control forward movement of the tool.

- (1) Note. Elements such as the stator and rotor of a turbine motor, piston and cylinder of an expandible chamber motor, etc., are considered to be "basic motor structure", and the transmitting element must be moved relative to all such basic motor structure for inclusion under this definition.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 38, for a swinging arm advance means with tool guided to rectilinear advance, said swinging arm usually being motor operated.
- 144, for reciprocatory drive and advance which originate from same mechanical element, said element usually being motor driven.
- 145+, for a rotary drive and advance which originate from same mechanical element, said element usually being motor driven.
- 147, for a flexible member usually motor driven to cause advance.

161 This subclass is indented under subclass 152. Apparatus in which means specifically adapted to be engaged by the hand of an operator to manipulate the tool drive is provided with a relatively movable means to regulate the flow of motivating energy to the motor.

162.1 INCLUDING MEANS TO VIBRATIONALLY ISOLATE A DRIVE MEANS FROM ITS HOLDER:

This subclass is indented under the class definition. Subject matter having structure which a) is positioned between an apparatus causing motion of a tool, i.e., tool drive means of the

apparatus, and b) functions to attenuate oscillatory or shock motion originating in the tool drive means hindering its transfer to the manipulating or supporting means.

- (1) Note. A means to dampen transmission of vibrations within the tool drive means, i.e., between a power source and the tool, is not included under this definition.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 139, for an impacting device combined with a separate impact cushioning means.

SEE OR SEARCH CLASS:

- 175, Boring or Penetrating the Earth, subclass 56 for subject matter dealing with vibratory type earth boring, and including vibration cushioning or absorbing structure.
- 248, Supports, subclasses 560+ for resilient supports, per se, and subclass 638 for means for isolating or reducing vibrations from a supported member to the supported means.
- 267, Spring Devices, subclasses 136+ for spring devices which do not provide support to any members, and are used to absorb shock or vibratory forces.

162.2 Handle type holder:

This subclass is indented under subclass 162.1. Subject matter wherein the means for supporting or manipulation the apparatus causing motion of the tool includes a part that is designed to be grasped by a terminal appendage of an arm of a user, i.e., a hand.

SEE OR SEARCH CLASS:

- 16, Miscellaneous Hardware, subclass 431 for insulated handle structure for a tool or the like.

164 This subclass is indented under subclass 163. Apparatus comprising a means which is specifically described as performing the dual functions of moving a tool about an axis to cause a tool to perform work, and to prevent movement about an axis of a section of tool shaft while moving another section of tool shaft about an axis.

SEE OR SEARCH CLASS:

81, Tools, appropriate subclass for a wrench, and particularly subclasses 54+ for a machine wrench.

- 165** This subclass is indented under subclass 163. Apparatus in which the means to move the tool about an axis remains fixed relative to the axis of tool advance and is adapted to impart torque to the tool while the tool relatively advances.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

148+, for a drive for a relatively advancing tool combined with a means to cause or control advance.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, appropriate subclasses, and particularly subclasses 434+ for a gear train or gear element, per se, adapted to drive a relatively advancing shaft.
464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, subclasses 162+ for a torque transmitting coupling which accommodates relative axial movement between coupled members.

- 166** This subclass is indented under subclass 165. Apparatus combined with a means which is selectively useable to prevent relative tool advance, said means including a motor or a relatively movable operating element to actuate the means into advance preventing condition.

- 167** This subclass is indented under subclass 165. Apparatus combined with a means to prevent relative tool advance by grasping the tool or tool shaft at a plurality of positions along the longitudinal axial extent of the shaft, which positions do not have to be preconditioned compared with other positions on the shaft to cooperate with the particular grasping means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

149, for a means to cause or control tool advance relative to a drive such means including means to grasp a tool shaft at any point.

SEE OR SEARCH CLASS:

188, Brakes, subclass 67 for pipe or rod braking means utilized in the advancing thereof.

- 168** This subclass is indented under the class definition. Apparatus in which a means specifically adapted to be engaged by the hand of the operator to manipulate the drive is provided with internal structure to convey motive fluid to a fluid operated tool drive motor.

- 169** This subclass is indented under subclass 168. Apparatus in which the internal structure of the means engaged by the hand of the operator is further provided with a means to permit or stop flow or adjust the rate of flow of fluid to the fluid operated tool drive motor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

18, for a tool drive controlled by relative movement of a manipulating handle.
161, for an advance causing or controlling motor control in a tool drive manipulating handle.

- 170** This subclass is indented under the class definition. Apparatus in which a tool drive means is provided with a means specifically adapted to be engaged by the hand of an operator to manipulate the drive and a means to control a tool drive (such as a motor control or clutch operating means), the control being related to the hand engaged manipulating means in such a manner as to enable the tool drive to be controlled and manipulated by a single hand of the operator.

(1) Note. Pistol grip type handle apparatus is classified under this definition.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

18, for a tool drive controlled by relative movement of a tool drive manipulating handle.
161, for an advance motor control in a tool drive manipulating handle.
169, for a means to control a drive motor motive fluid supply passage which is located in a tool drive manipulating handle.

- 171** This subclass is indented under the class definition. Apparatus not provided for in other subclasses.
- (1) Note. This subclass includes, for example, a collection of tool drive motors provided with specific manipulating handle structure.
- SEE OR SEARCH CLASS:
- 16, Miscellaneous Hardware, subclasses 110.1+ for handles of general utility, and including a handle for manipulating a tool drive.
- 176 Drive means responsive to torque speed condition:**
This subclass is indented under subclass 2. Apparatus in which the power operated means comprises a drive means and the sensing means senses either (1) a condition of force applied to the tool to move the tool about an axis or (2) the rate of motion of the drive means.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 93.5+, for a rotary tool drive which yields under torsional load and delivers torsional impact on a tool.
- SEE OR SEARCH CLASS:
- 81, Tools, subclasses 467+ for an assembling type tool with predetermined overload yielding means.
- 177 Fluid pressure change controls drive:**
This subclass is indented under subclass 176. Apparatus wherein the torque or speed of the device is measured by sensing the force exerted on a surface by a gas or liquid, the sensed condition effecting a valve which modifies the tool operation.
- 178 Having torque responsive clutch:**
This subclass is indented under subclass 176. Apparatus wherein a device to engage or to disengage the connection between the drive means and the power means is provided and operates in response to a change in the force applied to the tool to move the tool about an axis.
- 179 With speed responsive governor:**
This subclass is indented under subclass 176. Apparatus including a regulator controlling the rate of motion of the drive means.
- 180 With torque indicator:**
This subclass is indented under subclass 176. Apparatus wherein a means to display the amount of torque is provided.
- 181 Having torque sensor:**
This subclass is indented under subclass 176. Apparatus wherein a means is provided to detect the torque produced by the tool.
- 182 Strain gauge:**
This subclass is indented under subclass 176. Apparatus wherein the torque sensor converts mechanical motion into electrical impulse.
- 183 Proximity angle detector:**
This subclass is indented under subclass 176. Apparatus wherein the torque sensor detects the amount of rotation of the drive means.
- 184 WITH VEHICLE SUPPORT FOR DRIVE:**
This subclass is indented under the class definition. Apparatus combined with the significant structure of a vehicle which is (1) adapted to move the tool drive from work station to work station or (2) adapted to support and advance the tool drive during operation.
- (1) Note. By significant vehicle structure is meant more than a mere nominal vehicle or part of the vehicle, such as a bed, which is not peculiar to a transporting device. However, the inclusion of a nominal vehicle and the recitation of power take-off, plural wheels or plural skids, etc., comprises sufficient vehicle structure for inclusion under this definition.
- SEE OR SEARCH CLASS:
- 180, Motor Vehicles, appropriate subclass for a motor vehicle of general utility and particularly subclass 53.1 for a vehicle in which the driving motor functions as an external source of power.
- 280, Land Vehicles, appropriate subclass for a land vehicle of general utility.

- 185 Pivoted:**
This subclass is indented under subclass 184. Apparatus in which the tool drive means is mounted to the transport means such that the drive swings about an axis in relation to the transport.
- 186 Nontransporting means to support vehicle during tool operation:**
This subclass is indented under subclass 184. Apparatus in which the vehicle is combined with additional means to support the vehicle structure in a nontransporting condition during the time the tool drive is operative.
- SEE OR SEARCH CLASS:
280, Land Vehicles, subclasses 6.15+ for a land vehicle of general utility including means, interposed between the vehicle body, chassis, or frame and running gear thereof, for altering height or levelness of the vehicle body, chassis, or frame; subclasses 43+ for a land vehicle of general utility having vertically adjustable wheels for altering a dimension of the vehicle or a part thereof, especially subclasses 43.14 and 43.24 wherein additional nonwheel means engage the support surface; subclass 475 for a vehicle train provided with retractable ground support upon the draft connection for at least partially supporting one of the vehicles when disconnected from each other; subclass 755 for an attachment designed to stabilize or otherwise keep the vehicle from rolling or tilting past a given point; or subclasses 763.1+ for an exteriorly located retractable stabilizer, prop, or support attachment.
- 187 Adjustable nontransporting means:**
This subclass is indented under subclass 186. Apparatus wherein the nontransporting means to support the vehicle has means to vary its supporting position.
- 188 Having screw threads:**
This subclass is indented under subclass 187. Apparatus wherein the means to vary the support position includes a helically threaded member.
- 189 Having fluid cylinder:**
This subclass is indented under subclass 187. Apparatus wherein the means to vary the support position includes an air or gas powered expansible chamber.
- 190 Powered by motor or mechanism:**
This subclass is indented under subclass 42. Apparatus in which a device is provided to operate at least one of the adjustments which either (1) converts chemical or electrical energy or fluid pressure into mechanical energy or (2) contains a mechanical linkage.
- 191 Having screw threads:**
This subclass is indented under subclass 190. Apparatus wherein the mechanism has continuous helical grooves.
- 192 Having turnable:**
This subclass is indented under subclass 190. Apparatus wherein the mechanism is a circular rotating platform.
- 193 Having fluid motor:**
This subclass is indented under subclass 190. Apparatus wherein the motor is a pneumatic or hydraulic piston and cylinder type device.
- 194 With mechanical movement:**
This subclass is indented under subclass 193. Apparatus wherein the fluid motor operates in conjunction with a mechanical device such as linkages, gears, etc.
- 195 With flexible endless member:**
This subclass is indented under subclass 194. Apparatus wherein the fluid motor operates in conjunction with a pliable, continuous line (e.g., rope or chain).
- 196 Having flexible endless member:**
This subclass is indented under subclass 190. Apparatus wherein the mechanism is a pliable, continuous line such as a rope or chain.
- 197 WORK CLEANSING:**
This subclass is indented under the class definition. Apparatus including (1) a specific modification of the tool drive which is for the purpose of removing unwanted material from the work face being operated upon by the driven tool or (2) structure combined with the tool

drive which functions to remove unwanted material from the work face being operated upon by the driven tool.

- (1) Note. The arrangement of structure which will inherently perform a work cleansing function is included in this definition even through the described function may not include work cleansing (e.g., cooling or lubricating the tool).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 3, for automatic control of a power means in response to the condition of a cleansing means.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclasses 300.1+ for a cleaning machine, per se, including blast or suction.
- 83, Cutting, subclass 168 for a cutting machine combined with means to clean the work or tool.
- 175, Boring or Penetrating the Earth, subclasses 207+ and see the search notes therein for an earth boring means combined with means to handle drilling fluids or cuttings.
- 299, Mining or In Situ Disintegration of Hard Material, subclasses 64+ and see the search notes therein for a hard material disintegrating machine having means to handle material.
- 409, Gear Cutting, Milling, or Planing, subclass 249 for a broaching tool with means to clean, lubricate, or modify the temperature of the work or tool.
- 451, Abrading, subclasses 2+ for an abrading machine, device, or process with condition responsive control for sand-blasting; subclasses 75+ for a sand-blast abrading machine; and subclasses 103+ for an abrading machine with a scouring device.

- 198 Using vacuum or reverse circulation:**
This subclass is indented under subclass 197. Apparatus using either (1) a suction or (2) a circulation of fluid up through a tool in a direction opposite normal operation to remove unwanted material.

- (1) Note. Reverse circulation usually involves the flow of drilling mud or lubricant up through a drilling bit instead of down to the work.

199 Having outside conduit to supply cleansing fluid:

This subclass is indented under subclass 197. Apparatus wherein a supply line delivers a fluid to the tool without going through the working parts of the tool.

200 Hammer head driven by pulsating fluid pressure:

This subclass is indented under subclass 90. Apparatus in which a force is applied and subsequently released in rapid succession to a hammer head by a mass of fluid.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 13, for a drive motor controlled by a reciprocating drive member being connected to a pulsating fluid column.

SEE OR SEARCH CLASS:

- 60, Power Plants, subclasses 537+ for a self-cycling reciprocating motor of the pulsator type that may include a hammer head as a nominal load for the motor.

- 201 Pulsation caused by mechanical movement:**
This subclass is indented under subclass 200. Apparatus wherein application and subsequent release of the fluid force is caused by movable, mechanically operated elements.

- 202 Hammer head driven by spring:**
This subclass is indented under subclass 90. Apparatus in which the motion of the hammer head, at least in one direction, is caused by the recoil of a resilient element which has been strained or compressed.

- 203 Having cam to compress spring:**
This subclass is indented under subclass 202. Apparatus including an eccentric or irregularly shaped surface used to squeeze the spring.

204 Fluid spring:

This subclass is indented under subclass 202. Apparatus wherein the resilient element is a fixed volume of a compressible pneumatic or hydraulic fluid contained in a chamber on either side of the hammer head.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

212, for a fluid spring used as an impact cushioning means.

205 Rotary cam:

This subclass is indented under subclass 122. Apparatus in which the relatively moving means which transmits drive motion includes an element which moves about an axis, and which element includes a movement imparting slide surface impacting movement to another element, said slide surface being arranged at variable distances relative to the axis of rotation whereby rotation of the element imparts relative motion to said other element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

203, for a cam and spring operated impact tool.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclass 53, 54, and 55+ for mechanical movements of the rotary to or from reciprocating or oscillating type which includes a cam.

206 Hammer head constitutes piston of drive motor:

This subclass is indented under subclass 90. Apparatus in which the hammer head comprises or is rigidly connected to a disk or cylinder within a chamber, said disk or cylinder having a surface which is acted upon by a motive fluid in the chamber which causes the disk or cylinder to move and deliver a blow.

(1) Note. These devices differ from fluid springs in Class 173, subclasses 204 and 212 in that a fluid spring contains a closed fixed volume of fluid.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

127, for a piston formed of plural or diverse materials and which forms the hammer head of an imparting device.

200+, for a hammer head, generally comprising a piston, which is driven by pulsating fluid.

SEE OR SEARCH CLASS:

91, Motors: Expansible Chamber Type, appropriate subclass for an expansible chamber motor having a piston that may be recited as a hammer head.

92, Expansible Chamber Devices, appropriate subclass for piston of an expansible chamber device that may be recited as a hammer head.

123, Internal-Combustion Engines, appropriate subclass for an internal combustion engine having a piston that may be recited as a hammer head.

207 Having valve not directly associated with motive fluid for piston:

This subclass is indented under subclass 206. Apparatus having a means to control fluid flow not immediately involved with the force transmitting fluid for the hammer head.

208 With accumulator:

This subclass is indented under subclass 207. Apparatus wherein a reservoir to contain the motive hydraulic or pneumatic fluid is provided.

209 Driven by internal combustion engine:

This subclass is indented under subclass 206. Apparatus wherein the drive motor is powered by a gasoline or diesel piston engine in which fuel is burned within the engine proper.

210 With impact cushioning means:

This subclass is indented under subclass 90. Apparatus including resilient or flexible structure which is external to the hammer head or drive therefor which functions to absorb a blow under some condition of operation, or is adopted to cushion against the transmission of vibrations resulting from the operation of the hammer drive.

- 211 Mechanical spring:**
This subclass is indented under subclass 210. Apparatus wherein the impact cushioning means is a resilient element that recovers its shape after being stretched or compressed.
- 212 Fluid spring:**
This subclass is indented under subclass 210. Apparatus wherein the impact cushioning means is a fixed volume of compressible hydraulic or pneumatic fluid contained in a chamber.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
204, for a hammer head driven by a fluid spring.
- 213 MEANS TO DRIVE TOOL ABOUT AN AXIS:**
This subclass is indented under the class definition. Apparatus including means to impart torque to a tool and move the tool about an axis.
- (1) Note. The movement of the tool about an axis may be unidirectional or oscillating.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
5+, for an automatic control of a power operated advance means in response to a torque or speed condition of the drive.
93+, for an impact type tool drive having an anvil arranged to deliver torsional impact to a tool.
94+, for a hammer head which moves about an axis.
104+, for a tool impacting device combined with means to move the tool about an axis.
140, for drive gearing which advances relative to a source of power, and including gearing moving a tool about an axis.
145+, for a rotating tool drive which originates from the same mechanical element as the means causing or controlling advance.
148+, for an advance causing or controlling means for a tool advancing relative to the tool drive, said drive generally moving the tool about an axis.
- 176+,** for an automatic control of a drive means in response to a torque speed condition.
- 214 Plural tools:**
This subclass is indented under subclass 213. Apparatus wherein the drive means can power more than one tool.
- 215 Endless flexible drive means:**
This subclass is indented under subclass 213. Apparatus wherein a pliant, continuous line (e.g., rope, chain, etc.) powers the tool.
- 216 Gear drive:**
This subclass is indented under subclass 213. Apparatus wherein the drive means consists of toothed interengaging mechanical elements.
- 217 Electric motor:**
This subclass is indented under subclass 213. Apparatus wherein the drive means is a device which converts electrical energy to mechanical energy.
- 218 Fluid motor:**
This subclass is indented under subclass 213. Apparatus wherein the drive means is a pneumatically or hydraulically operated power device.
- 219 Having sound attenuator:**
This subclass is indented under subclass 218. Apparatus wherein a means is provided to muffle or absorb acoustic vibration.
- 220 With means to rotate reciprocating piston:**
This subclass is indented under subclass 218. Apparatus wherein a means is provided to revolve a linearly oscillating piston about its radial axis during its oscillation.
- 221 With manual means to control motor:**
This subclass is indented under subclass 218. Apparatus wherein a means is provided that is directly actuable by an operator of the tool to regulate the motor.
- 222 Plural motors:**
This subclass is indented under subclass 218. Apparatus having more than one motor.

END